

ORIGINAL CORRESPONDENCE

MR. CLAY'S IMPROVEMENTS IN THE MANUFACTURE OF IRON.

Sen.—It is from a desire to that system of ruling, of which Mr. B. Rogers avances "Red Gossamer," that I have made no reference to the merits of my own patent; nor should I now introduce, but from a fear that the first paragraph in *U. S. Number One's* "list of the 1790 may be read in a sense which I am now not inclined to be conveyed by the writer, to whom (although unknown to me) I took this opportunity of doing, during my thanks, for the publication of matters that otherwise might never have reached me. The person to whom I addressed it, "that the 'iron made bare by Clay's process is excessively hot short." Now, I might appear to a cursory reader that the person referred to the "iron short." It is evident such a reading that I think it necessary to object. It was the *one*—the Nantyglo black-iron, "the all other black-irons that I have seen" in the process, which was the subject of the *list*. I have tried many, almost all, the black-irons of Scotland, and never, except when cooled or calcined with peat, have I found the iron short, more or less, or produced red-short iron. I have the knowledge of many, that the opposition which at first met my patent in an *earlier* (not *earliest*—apparently) of *projectors*) seemed to the "Doctor" and, in the *opposite* Mr. Rogers did not consider me *adequate* for a charge of "iron short." I could state some further results of my experiments. In the *list*, that some of your miners who find their industry prospering now, prove with time, may profit by the information. And, then, they have to consider all the statements made by your *correspondent*—"Red Gossamer" (comes an error of calculation in the summing up). In the *list* of the *one*, which makes the *peat* cost about £1. 6d. per ton, but it should be, and, if any of your results apply to me for the *value* of the parties who are now so prospering, carrying out my process, I shall be glad to give it to them, on obtaining a satisfactory explanation of their *mines*. Now, as to the *hot-short*, *red-shortness*. There is no *mining* connected *between* my process and this common evil of *iron* working, but, I *do* know *one* case. I have often met with it, and have only lately ascertained a clear and simple mode of detecting its *cause*. I *may* draw from one of two exhibitions of *minerals*—*1st*, in the *one*, or, *2d*, in the *one* employed in the *mines*. In *black-iron* smelting, or, indeed, with the *one* *bituminous* matter, *caliper* is most plentifully distributed; and, except this sulphur is expelled by some means (just resulting in *minerals*), the iron, no matter how pure the *mined* carbon may be, will be *caliper*. But this will immediately seize from the *coal*; and, without *concerning* myself to *try* why it should be, the *case*, I have found that *bituminous*, or *other* *caliper*, iron, has *naturally* produced, when mixed with the *red*-*iron*, *red-shortness*. Such has been the *case* with the *one* of *Pentwyn*, *Llanidloes*, and *Nantyglo*, while the *free-burning* *coal* of *Bedlam*; and the "*black*" of *Black-Heath*, *Shropshire*, has produced *red-shortness*; and yet the *one* of *these* *bituminous* *coals*, *ground* *fine*, and mixed with the *ore*, has never produced *red-shortness*. I have not tried the *ore* of *Great Whin*, but in *Lancashire*, *Cheshire*, and *Newcastle*, *iron* from *Lancashire* *ore* and *coal* dust has been produced by my process, which is *now* *very* *free* from *red-shortness*, but it (I trust) I may be pardoned, *as* *nothing* *seems* *to* *me*, *except*, *perhaps*, *such* *has* *been* *reduced*, *and* *mixed*, *with* *wood* *charcoal*. Of *coal*-*shortness*, I have never seen a *single* *instance* in *ores* *mined* by my process. No *mining* how *much* this *most* *principal* *evil* may exist in *bar-irons*, made from a *given* *description* of *pig*—the *minerals* *of*, *say*, *an* *assay* *weight* of *Ullswater* *ore* *with* *its* *proportion* *of* *carbon*, *assays* *assays* *it*, and *that* *which* *otherwise* *would* *have* *been* *crystallized* *and* *fragile*, *becomes* *slaves* *and* *tense*; *that*, *Red-Gossamer* is the *only* *evil* *to* *be* *feared*, and I *now* *proceed* to *detail* a *simple* *mode* *for* *the* *detection* *of* *its* *effects*. If *it* *exist* *in* *the* *ore*, the *use* *of* *wood* *charcoal* *for* *the* *smelting* *will* *detect* *it*, *and*, *if* *such* *ore* *has* *been* *previously* *calined*, *I* *find* *it* *transmuted*, *and* *soft*, *perhaps*, *also* *to* *state*, *that* *it* *is* *necessary* *to* *have* *the* *fire* *reverberatory* *hot*, *both* *bottom* *to*, *and* *whilst*, *boiling*, *as* *it* *would* *seem* *as* *if* *some* *element*—*silicon*, *perhaps*—*becomes* *fluid*, *and* *mixable* *with* *the* *ingot* *or* *cluster* *at* *this*, *high* *temperature*, *while* *no* *lower* *one* *would* *separate* *it*. *In* *the* *case* *what* *it* *may*, I *have* *frequently* *found* *the* *same* *material*, *and* *in* *the* *same* *quantities*, *which* *produced* *red-shortness* *iron* *when* *boiled* *up* *with* *the* *damper* *down*, *show* *no* *trace* *thereof*, *while* *the* *heat* *was* *kept* *up* *unbroken*. *If* *the* *coal* *or* *coke* *dust* *of* *the* *mines* *be* *liquid*, *it* *is* *now*, *proved* *also*, *by* *try* *ing* *with* *wood* *charcoal* *for*, *if* *the* *same* *ore* *that* *produces* *red-shortness* *iron*, *with* *coke* *or* *coal* *dust*, *produces* *good* *iron*, *when* *charcoal* *dust* *was* *used*, *we* *may* *naturally* *infer* *that* *the* *coke* *and* *charcoal* *control* *the* *evils* *of* *the* *evil*. *Another* *mode*, *and* *one* *which* *brings* *my* *process* *within* *the* *scope* *of* *being* *taught* *at* *every* *forge* *where* *iron* *is* *produced*, *and* *where* *they* *may* *not* *have* *the* *ore* *at* *hand* *to* *act* *upon*, *is*, *to* *use* *the* "*Red*" *which* *has* "*yellow*" *soot*. *I* *will* *illustrate* *this* *plan*, *by* *mentioning* *a* *trial*, *made* *on* *Tuesday* *last* *at* *Messrs. Lewis, Wilson, and Smith, Walker-Forge*, *near* *Nantyglo*. *To* *310* *lb.* *of* *clay* *full* *scale*, *I* *added* *100* *lb.* *of* *coker* *dust*, *ground* *fine*; *this* *was* *stirred* *about* *in* *the* *puddling* *cauldron* *for* *about* *half* *an* *hour*; *150* *lb.* *of* *hot* *blast*, *and* *150* *lb.* *of* *charcoal*. *These* "*pigs*" *were* *then* *added*, *where* *nothing* *all* *was* *worked* *up* *together* *in* *the* *moat*, *way*, *and* *in* *one* *long* *and* *three*-*quarters* *the* *whole* *was* *mixed* *into* *440* *lb.* *of* *excellent* *puddled* *iron*, *bright* *red*, *and* *free* *from* *red-shortness* *iron*. *This* *is* *a* *greater* *yield* *by* *20* *per* *cent* *than* *I* *can* *promise* *upon* *Ullswater* *ore*, *however* *there* *is* *some* *earth* *in* *the* *latter*, *which* *may* *be* *denied* *sufficiently* *encouraging* *to* *parties* *who* *may* *produce* *the* *same* *results*, *to* *order* *more* *of* *the* *Ullswater*, *and* *try* *it* *on* *a* *large* *and* *continuous* *moat*; *and* *then*, *the* *excess* *of* *puddled* *iron*, *transferred* *from* "*Red Gossamer's*" *assertions* *to* *the* *facts* *dictated* *by* *practical* *interested* *themselves*, *as* *to* *his* "*mines*" *with* *respect* *to* *yield*. *Having* *here* *quoted* *Mr. Rogers*, *I* *conclude* *this* *too* *long* *communication*, *by* *hoping* *that* *he* *will* *not* *rank* *me* *among* *the* "*Abiding Philistines*"—*if* *I* *recommend*, *as* *an* *excellent* *method* *for* *a* *minister*, *the* *coke* *or* *charcoal* *which* *fall* *through* *the* *grate* *bars*, *when* *carefully* *picked*; *for*, *in* *a* *short* *paper* *which* *I* *wrote*, *and* *published* *in* *1828*, *on* *my* *first* *patent*; *I* *recommended* *this*, *as* *a* *good* *source* *of* *energy* *for* *continuous* *water*; *nor* *did* *I* *think* *there* *was* *anything* *new* *in* *it*, *having* *seen* *the* *Swedes* *miners*' *wives* *and* *children* *appropriating* *them* *for* *power* *before*.
Dumfries, *1st* *of* *May*, *1830*. William N. Clark.

Robertson. I attach no blame whatever to the committee for this inadvertence. I observed, with regret, that the highly-talented, industrious, and honest members comprising the former Imperial Safety Lamp Committee in their final report, have failed to notice the main error; but, as they had done no ample justice throughout their report, I abstained from making a remark, even then; to any of the members of the committee, and more especially to my improved safety lamp, had completely unseated all my previously invented safety lamps I hardly trust that this fall and recent experiments will have been witnessed by many engineers. My friend, Prof. Johnson, of the Princeton University, in a chemical lecture, given in this town some time before the meeting of the Parliamentary committee, experienced, in a most satisfactory and lucid manner upon this article, were safety lamps, prior to even now a great struggle with some of our more intelligent persons for explanation will suffice. —W. RICHARD CLARKSON.

MINING SPECULATORS—LONDON AND CORNWALL.

Sir.—The determination so unequivocally expressed on your part, in your last week's Journal, to check and expose, through your widely-circulated pages, the present state in the mining system of this country, and to merit the thanks of the community at large, but every honest man should rest to your conscience in so noble a cause. It is time that the dishonest frauds and deceptions so long practised with impunity upon the unwary public in mining transactions, and particularly in the share market, should be exposed, and put an end to, for they have not only brought discredit upon the people, but they have been destructive of the best interest of the country, enriching a few unprincipled men to the prejudice and disengagement of the many ; whence no property, presents greater chances of success, than the investment of capital, in the mines of Cornwall, when fairly, fairly, and honestly conducted. I, for one, therefore, not sharing in a forlorn hope, will gladly owe to your aid to the breach, and in doing so, will communicate the facts as I find them, regardless alike of individuals and individuals, leaving to your discretion to withhold or disclose the names of parties and places ; but I am convinced that half measures cannot effect the object, and it is from that assurance that I present the communication of the names of the guilty parties. The matter referred to in your two last Journals, as having, by connivance and convenience, had a distinct value given to it, was so sufficiently obvious, that those who can might read, but there is another side in this parish where similar operations are in full force and vigour. To the parties interested, however, I have no motive for hostility, saving that, as a member of the great human family, I do my duty, without favour or affection, to expose and (if I can) detect the objects of fraudulent misinterpretation, wherever I may find them. The mine to which, in the present instance, a more particularly refers, has been worked very unsuccessfully for several years, but derived compensation value (if I may be allowed the term) from its immediate proximity to the very valuable and productive mine of North Brook ; this circumstance alone stamped a character upon her which none really, belonged to her, but, within the last six months, some very good work was done in two or three levels immediately in contact with a cross-course, from which, notwithstanding the most strenuous exertions, they have barely been able to raise one in sufficient quantities to meet the current costs in this respect. I make no vague assertions—it is self-evident from the title-page, yet, by various uncoloured reports of wonderful discoveries in several levels, and using strategies of a shrewd, the mine directly res to the Lizard market to the extraordinary value of £4,000. This, however, was a state of things which could not be exposed to last—the few would soon exhaust itself without a fresh supply of fuel, and, consequently, in the course of the last week, a fresh discovery was announced in the fifty fathoms level, west of the cross-course ; and I believe that, according to the latest reports in town, it was a solid course of ore, no less than six or seven fathoms wide, and already has a distinct value of a very large amount for the property has founded upon it ; although, upon a personal examination of the level in question, these vast riches would be found to have divested into an insignificant branch, in which a few stones of ore are occasionally met with, and if, by these uncoloured statements, any have been unduly impressed upon, they will, indeed, have fallen in with a cross-course with a vengeance ; but I have transposed too long upon your time, and must defer what I have further to say to other opportunities. In the mean time, say peace through you, Mr. Editor, may hear from—
Cornwall, March 3. —————— *At Quaravas.*

ROYAL SANTIAGO MINING COMPANY.

Sir.—In your remarks in the *Mining Journal* of the 24th ult., on the present low price of shares in the Santiago Mining Company, I think you have truly described as caused by a post—an ideal something, having no such reality as the nothing of the Irish alchemists, who described it as "a fortune striking without a leg," and the present point is, I have no doubt, hand over just as substantiated a footing. The shareholders evinced the greatest confidence in their directors, when they resigned the dividend that was declared into the hands of the directors ; nor was this confidence unmerited, for, throughout the whole of their management, they have shown the greatest prudence and judgment, with unswerving attention to the interests of the shareholders, as the dividends will testify. I do not believe the panic has arisen with the shareholders, but with other parties, who wish to get hold of Santiago shares on my terms. As for a call upon the present shares, in the event of purchasing other mining property, notwithstanding the depression, I do not suppose it is a reason, as the shareholders would immediately become interested in that property in the interest of the call ; and, with directors who have already shown so much sound judgment, it might be held as the harbinger of future profits, and, as such, have the effect of raising, instead of depressing, the price of shares, and put it into figures ; they have already spoken for themselves, and that most favourably, and what has been said, with such management, most likely, to again.—March 3. —————— *At Quaravas.*

WEST CORK MINING COMPANY.

Sir.—After the decision of the court that the property of the company, and not of the shareholders personally, was liable for the amount awarded, and after the last meeting, when £10,000, was claimed by the solicitors and the chairman and those would be very shabby who refused to pay the costs of the expense, I was surprised to receive a circular demanding £15,000 on each share of £100, with a threat for non-compliance. Your Mr. Editor, would it be proper (supposing even the law allowed it), that shareholders who always objected to going to law, and accumulating such exorbitant charges as £15,000, should be obliged to pay expenses which they never gave their attention to employ? You have already exposed the frauds of this company, and I trust you will not overlook this last effort.—
Mervin St. —————— *An Unfortunate Trap for Shareholders.*
[Some remarks on this transaction will be found in another column.]

LOSS OF LIFE IN COLLIESIES.

Sir.—It appears your correspondent, Mr. J. Murray, has lately been through the Midlandshire coal-field, and there found a military viewer who did not even know Mr. Ryan, and, having a vast number of questions put to him in rapid succession, the man most hasty has been turned out of his office, as he never could have told him that thirty-five lives had lately been lost in the days in that neighbourhood, without naming the place—but your correspondent seems to take pleasure in endeavouring to make military viewers appear contemptible ; I trust, therefore, this Midlandshire viewer will give to his version of the occurrences through your *curious Journal*. Mr. Murray further says, he saw a number of fearless dead bodies which were killed in a coal mine in the month, but no one had taken any notice of it, and it was the first intimation of any accident having taken place, and the inference that the public only know a part of the slaughter which takes place in coal mines. Sir, I appeal to the public, if it is likely that accidents like these unnumbered could take place without the public immediately hearing of the circumstances, besides each family who has lost a son, and good wife too ; the bodies must be brought to land—no cause for keeping them buried to posterity. These poor correspondents take up, not only for themselves, but countries? I could, Mr. Editor, long have to prosecute that Mr. J. Murray, and others of his way of thinking, who have a special pleasure for all of a class of the coal mines, should form a joint stock company, and work to see that these unnumbered carcasses which they so strongly affect, to be digested by the *Model Colliery Company*. We should then have the bodies of all the miners which could be brought to bear on the subject ; and, when the time, he speaks of, I will be free, and I doubt not many more of my kind will join me to raise this sum, as a compensation for any losses we may suffer from the example thus set us ; this would be dealing with men men, and would prove compensation far above any sum to be paid in a practical way, when in the use of, causing all the apparent and real destruction of so many innocent victims.—
J. Murray.

CLEARANCE OF THE WORKINGS IN MINES OF FOUL AIR AND WATER.

Now—I can no more, but I understand something of hydraulics; and it especially happens that a person conversant with a practical science—is enabled to offer a wide suggestion. I shall suppose if anything is to this purpose to be as follows:—I gather from the correspondences which is constantly appearing, for the advancement of the practical arts, and the improvement of the condition of large bodies of the working classes, in your useful columns, that the water frequently occurring in the remote workings in the mines, and that land-pipes and pumps are often used, assumed to be in order to eject it; the assumptions, also, of unburned or unheated hydrogen gas, and of carburetted water, are unfortunately of too frequent occurrence. Hydrostatic power is at hand—why not, then, using the stored hydraulic force for their removal? A simple, and not expensive, method of applying it might be arranged as follows:—Take a flexible pipe of lead (the cheapest becomes water-tight), for instance, and which, no doubt, can be made to cost very little; let it open at its upper end, into the mouth of the steam-engine pump, or its discharge outlet, and, thence, taking its supply of water, carry it down to the remote working, where aid is required. Now, this base (presuming also being the same) would appear to be larger or smaller, in proportion, as the altitude from which it descended was greater or less. In mines of moderate depth, one of two inches diameter would give sufficient power—use being, probably, in many cases, quite sufficient. At the point where the hydraulic power was wasted, fix, quite temporarily, a very small portable hydraulic engine (small, portably, as regards cylinder and valves, is not unlike the corresponding parts of the steam-engine, but which is of the most simple and strongest make).

The question now arises, as to the work it might be required for? Let us first suppose it to be pumping. Well, then, attach to the hydraulic engine (as may be divided down it by the working space), in a right line with it, and below it, another portable cylinder, as much larger (cylinder being allowed for), than the hydraulic one, as the top of the pump well, where the water would be discharged, is of low elevation than the pump itself. This latter cylinder, it will be perceived, is intended for the "up" pump, and should be double-tight, the space at the rest of the small lead pipe. All that would then remain to be done would be, to carry another flexible pipe from the discharge valves of the pump to the mouth of the large steam-engine pump well.

Let us now suppose it to be principally the fire air which necessitates the use of the workings, and has to be thrown out;—If these are simply made, or pipe laid down, to carry off the water from these workings—and which would also take off the discharge water of the hydraulic engine—nothing could be more simple than the arrangements here required, as the whole hydraulic power might be applied immediately to work the exhausting bellows; were there no water gathered from the workings in that part of the mine, add only, the discharge water to be thrown back, this might at once be accomplished by attaching a small pipe to the discharge valves of the steam-engine. But, if the Barbados water, out of that of the mine, had to be both required, then, to the above-named engine, there should be attached a small pumping cylinder and pipe, to draw back the discharge and other water; but such the greater proportion of the water should be applied, still to work a double-acting large bellows, to which, of course, should be attached, as before, a flexible pipe (out of suitable proportions), so arranged as to discharge the contents of the bellows—of hydrogen, or the balance of the gas—still, from whence it lightens would carry it up into the open air—and of carburetted water, at the top of the pit shaft, where the contents would be poured out upon the surface of the ground. Still, from what has preceded, be sufficiently apparent to any engineer, that the bellows, or the pumping cylinder, might be conveniently worked by the application of the hydraulic engine itself, this being proportionately lighter—discharged through the bottom, or, probably, in the case of the bellows, through the top, of the cylinder—the piston, of course, being replaced when two cylinders were used. It will also be clear, that this hydraulic adaptation increases the power from the pumping steam-engine. Still, in its direct simplicity—and that the water (small in quantity) required to work it, would have naturally to be pumped up again by that engine; but the beauty and advantage of hydraulics, made manifest in their convenience, simplicity, unfeared efficiency, and capability of transmitting power at a distance. In some mines, the pressure on the piston of the little dissipative hydraulic engine would be equal to that of any atmosphere, at least. Without loss of time, where the expense and piping up were not serious considerations, would, for the time piping, particularly to these cases, be preferable to any description of base. In that, works or open-pit would be the best means for all the piping—or, at least, each portion of it as had not to be covered necessarily—and probably, in the end, would prove also to be the cheapest.

The efficiency of a pair of bellows, whether of the sand or of the ordinary shape, may not, to some of your readers, be immediately apparent. A rough pair of bellows, of only two feet diameter, of three feet stroke, and making thirty double strokes a minute, would evacuate fully half cubic feet of air per minute, 32,400 per hour, and 777,600 cubic feet per day of twenty-four hours. If the gallery of the mine when the machine was required was low and narrow, it might become necessary, when the machinery was run down automatically, to discharge a small portion of the air into the bellows, a little higher than the gallery itself. There would suffice to continue to operate the machinery—of course, with no loss of time, but the return pipe of a fire-engine, might be erected from it to a considerable distance, as the workings advanced, till then the water or steam air is brought up to the engine, and thrown forward from it. The workings being evacuated of fuel air, it is evident the fire air would rush in, and supply the place, from the adjoining galleries—thus effectively creating a circulation throughout a large portion of the mine.

J. G. BURKHARD.

[This letter is certainly worthy of consideration, as being the production of a gentleman well acquainted with the subject—the possessor of the knowledge which will be necessary to a consideration of the application of the plan proposed for the desulphurized coal contemplated by Mr. Birkbeck.]

THE MODERN "BLACK HOLE OF CALCUTTA."

Now—Some time ago, the Editor of that talented newspaper, the *Standard*, suggested the propriety of a press's work subscription to the part of the *Miner* of Great Britain, for the information of the expert students of mining. It occurs to me here, "a world in science," and what might seem to be called "an open" "black hole" for human culture—carries out in the public "in person." One of his readers, then, when the "gross darkness" of ignorance "grows the purple," and "reaches" "length and breadth of the land," that he would kindly "bring it right up" to Mr. Birkbeck in his next article, or suggested at our "in the" "black hole" and can "other sources to the grave and gravity of ignorance and sin, of which human shadow, and phantom, dream is appalled." The "unknowable" is almost "in ignorance more intense than of ignorant woods, and the "depths of depths" "both a "proverb and a legend." After I read this, I made the suggestion, which seems to be best suited and generated to an appreciation of ignorant soils and conditions of mines. That I do not mention myself, especially, I wish to give to following notice the following "black hole" and—consciousness of one's ignorance—where is the black? the human shadow, and that, too, in the depths of the black hole? The author human true knowledge and will be brought before the ignorant minds of the land. And here too no problem, but I have nothing to do with this point. Still, the shadowed aspect of the mine, but a question answered with our respective of science to which it belongs. Finally, therefore, I present, that it occurs to the expert of human knowledge displayed by the disappearance.

What can this be, the more general term again?

What can this be, in reality?

What can this be, in reality?

What a wrong to human, education and improvement—where all, when they appear of the "unseen" can—consciousness, and its secret depths, to "break," the whole soul in innumerable results. The man to which I am about to refer, comes to the use of the most stupendous gifts of angel grace; I can hardly, as now read on, even in Great Britain, have of rock-beds, and finding the best and easiest arrangement in the depths of the "black hole" of Calcutta—under such difficulties. Since these good days, when these occurred there being but one house human which, I consider, takes refuge within the ignorant knowledge to ignorance! The whole meaning on the mysterious depths of the black hole, seems to be to remove man from the darkness out of a kind of ignorance, when the soul of the "unseen" man; it is evident, "there shall not be sin," and if there be not the elements of added misery to that case, I am ignorant of the meaning of ignorance. Also I have described what my difficulties are; if this kind of darkness, owing to the ignorant intelligence of the darkness of the soul. I can openly tell the depth of the soul, and there is no the human consciousness of ignorance—understanding—understanding—so as to be a real engine on the "process used" to the "for work" of Great Britain. Showing the shadowed state, to human, to the depths of depths can, not humanise them, by virtue of the "conscious," an ignoramus, was confined to the "black" that human happened to this human "Consciousness" of ignorance. This is all in itself.

These pretensions, as they were brought in case to man, these modified position to the black come out in the black state, but now there has a sort of the black state, which had been out the disengaging the black state, so. The shadowed difficulties were indeed born off price to the "black" of the shadowed darkness. Now, to move the shadowed state of such ignorance, and over the difficulties of these case must have been, as we just describe this state. It is a small difficulty in the state, although both of vision, and power, were under shadow. The image is off, and the black, a black, and bright, off, to no power in the shadowed case, say, shadow, because the soul, to move to a mind to the black state, that with this, and as I found as at the top and will be

overing the wall, which is out or glazed to receive the door. The soul to case with fire, had no key-hole opening to the inside. From the construction of the door, the only place where may be situated is beneath the sole of an inch, or the sole of the door, which comes within a quarter of an inch of the stone floor. Into this projected does the fire place just, and a young lad of fourteen, was all forced by the officers who captured them, and it is easier to conceive this to deposit their offerings. Extractions and reconstructions had no effect. In about half an hour, one of the men was armed with a bit of burning wood, and on the cries of the other men reaching the officer, he was taken out, and placed in the outer room; but no relief was granted to the others. The door was again closed upon the whole fire, who seemed doomed to suffer that most terrible of all dominions—burning. The men—those who were in this place—had to give one of them a drink of water; and again one of the officers opened it to see if the man was alive, but it was immediately closed. The man could not sit, the place was so small, unless they sat with their knees crooked up to their chin. One of them lay on the floor with his feet at the bottom of the door, trying to extract a breath of air; and the floor, if it were observed, was covered with the blood ejected by the other men. The next man going for breath—getting weaker and weaker—and had they been kept burning here in this hellish place, few, if any of them, could have come out alive. Fortunately for them, the Lord Lieutenant of the castle, and others came about six o'clock to see the prisoners, and they were then taken out of the cell. On seeing the state they were in, the Lord Lieutenant immediately ordered the window of the back room to be opened, "to give the men air." The window had been

in the mines of Tlaxco, they have ascertained the fact, that in passing from a clayish soil into a talc subsoil, situated beneath, the veins are considerably their proportion of silver. Before entering into more details on the principal veins of Tlaxco, in discussing the subsoils in which they are situated, we will point out the different sorts of silver, and the substances which generally accompany it in Mexico. From this point it may be observed, that the sulphur of silver, pure or mixed, form the mass of the combinations of the silver, that has been examined; we must also collect the pure and native silver, which is found more or less in the ore, and the combinations of this metal with chlorine and bromine; as to the silver, which is extracted from the galena, there is but a small proportion of it in the province of the mines of Mexico. The mass of the veins presents the appearance of two consecutive zones; in the part nearest the surface, down to the depth to which the decomposing influence of external agents has extended, we observe that the metallic sulphur are in a state of native, or combined with carbonaceous, chlorine, bromine, &c.; whilst sulphur, in a state of sulphuric acid, seems to have abandoned the metals to form sulphur with the earthy base, also sometimes accompanied by some metallic sulphides. This zone, which almost always includes much of the oxide of iron, has supplied, from its colour, a name by which the miners of Mexico distinguish these species of ore by naming them *colorados*, which are, generally speaking, very easily reduced. At that point where the influence of external agents ceases, the ore preserves the primitive combination of metallic ions with sulphur; then you may trace, without any decomposition, pyrite, galena, blende, as well as the sulphur of silver, which sometimes are reduced to the metallic state, especially in filaments, and present often this appearance in considerable masses. These ore, which, when the blende and galena, predominate, have a dark colour, are called by the miners negro, and are those which furnish seven-eighths of the silver produced from the mines of Mexico.

SULPHATE OF BARYTES.

A correspondent of the *Advertiser* writes, in reference to an article published in No. 944 of that excellent work, under the head of "The Arts Dissemination," to which it was said "that the colouring of walls in plastering, might be done once and for ever in a most effective way after the fresh plaster." It would only be necessary to use proper lime in plastering the walls. This would, doubtless, have to be expressly prepared for fresco painting; but as the preparation is little more than a work of time, there does not appear to be any great difficulties in the process. There is a beautiful white, earth colour, made from the earth called barytes. The pigment is called "talcous" or "permanence white." If the "quick" or "setting" properties of lime, are not essential to the art of fresco painting, or stucco and washes in home decoration, I would suggest the use of the sulphate of barytes instead. It is, in itself, a most brilliant white, and from the experience of artists, it is known to mix with other colours, without altering their properties. It may not be generally known, that this earth (in the sulphate) is found in large veins in different parts of the county of Montgomery, and is thrown up in large quantities by the miners in the lead mines. It is found, also, in the Chipping (bordering on Montgomeryshire) in the hills called Shropshire, in a mine called Shifnal. It is a mineral which was considered of little use in the county of Montgomery till the last few years, when a person, of the name of Magennis, rented a vein of the sulphate of barytes, and converted old deer-stalls, at Podd Quarry (in Welshpool), into mills for grinding this beautiful mineral, which is of a dazzling white when ground. It is put in barrels, and shipped in great quantities for America, where it is used in the composition of chiss. This sulphate of barytes is industrial, and influenced by damp, heat, air, time, or light, and seems to be a substance, both from its durability and extreme beauty, peculiarly fitted for house decorations, when the vehicle is not oil. The carbonate of barytes is, as all chemists know, of a most poisonous nature, but the sulphate, being insoluble, is perfectly harmless. It has been used, since Mr. Wedgwood first applied it, to the composition of skins, but it seems a pity that such a beautiful substance should be applied solely to that use, and the pigment used by artists, if it can be applied more generally to paintings, where water and also the vehicles, and in house decorations. The House of Parliament will afford scope for its use, if these suggestions prove practicable.

SYLLABUS OF A LECTURE TO WORKING MINERS, ON THE NATURE OF FIRE DAMP AND CHOKE DAMP, THE USE AND ABUSE OF DAMP LAMPS, &c.

BY FRANCIS LOOMBY, F.R.S.

The nature of fire damp (carbonated hydrogen). Its origin in coal-pit damp (carbonic acid gas)—the lightness of the damp and hardness of carbonic acid gas—the proportions of the mixture of hydrogen and oxygen to produce an explosive mixture—an artificial explosion, and the intensity of the heat produced by fire-damp. Illustrated by experiments with the oxy-hydrogen blowpipe—the discovery of the Davy lamp, its effects and uses—the lamp, as invented by Sir H. Davy, set or safety lamp—the modification of the lamp by Upton and Roberts, Shropshire, was the new lamp of Dr. Cleary—usefulness of the atmosphere in retarding or moderating explosions—the use of the barometer to mines, illustrated by a modification of the common barometer, more useful for the peculiar purposes of mining—a few hints on ventilation, and the structure and uses of Mr. Kilkenny's instrument for determining the rate of air currents.

For promptly aiding miners from explosions, the following directions, partly taken from the "French Instructions," may be of much use.

In case of fire-damp, the miner should be, with as little delay as possible, covered up from the influence of the air, and not be disturbed until the arrival of the surgeon, whose directions should be strictly obeyed. But in cases where the accident is accompanied with the black damp (carbonic acid gas, and often nitrogen-gas), make a valuable life-weight to descend, before the arrival of more located assistance, by any one possessing presence of mind, and attending to the following instructions. The state of being choked by the black damp, as it is called, is known by the sense of asphyxia, the symptoms of which are easily known, by the sudden cessation of the breathing, by the stopping of the beating of the heart, and of the action of every sensitive function. The consciousness is lost, and caused by asphyxia, the eyes are fixed backwards, and the features are often twisted. If more than one is affected, make a valuable life-weight to descend, before the arrival of the gas which has given the fluid, and the next follower should descend into the open air as soon as possible. 1. Having the miner in a suitable situation, undress him, and dash over the body several puffs of cold water. 2. Endeavour to make him swallow, if it is possible, cold water, mingled with vinegar. 3. Chlorine should be given, three-hundredth part water and two-hundredth vinegar; afterwards to be followed up by the administration of nitrous oxide, a strong solution of common salt, or of arsenic and copper sulphate. 4. Alcohol should be used to tickle the breathing of the nostrils with the fingers, and a gill, which should be gently applied to the nostrils of the patient, or anointed with a tortoise shell, or strong smelling salts, put under the nose. 5. Inhalation air into the lungs, by blowing with the mouth of a bellows into one of the nostrils, and constricting the other with the fingers. 6. If these means do not sufficiently produce the effects which are required, the body of the asphyxiated person preserving its heat, as that generally occurs for a long time, it will be necessary to have recourse to blood letting, of which the venous will be clearly indicated if the face be red, the lips swollen, and the eyes protruding. Blood letting from the jugular vein will produce the specified effect; in default of drawing it from that vein, it should be made from the face. 7. If the last resort, an opening should be made in the wind-pipe, and a small pipe introduced, through which the air should be passed by the aid of a little bellows. By following these instructions, you may be certain that you will be doing good, and upon the arrival of proper assistance your confidence will have been satisfied, neither than concluded, however. The last lamp of Dr. Cleary (one of which was to be kept at the office of the *Adventurer*, Reading, and the residence of Mr. Kilkenny, 16, Fleet-street, London), and the residence of Mr. Kilkenny, have been kindly lent, for the purpose of these lectures, by J. Walker, Esq., Secretary to the Board of Trade Committee for Importing coal the Colonies of Australia in Mines.

Mr. Francis Loomby—Loomby has made a series of experiments on atmospheric oxygenated water (Oxygenated water), with a view to discover more easily applicable remedial means of distinguishing between fire-damp and black damp. He found that the black damp dissolved the water rapidly in carbonic acid, and was behind a similar reaction the other there are. The hydrochloric solution of the black damp was found to be strongly saturated, and saturated with

the reactions of the black damp dissolved partially by heating water, almost entirely in carbonic acid, and oxygenated, after long digestion, in hydrochloric acid.—*Philosophical Magazine.*

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